(19) Europäisches Patentamt
European Pat nt Office
Office européen des brevets

(11) Publication number: **0 478 067 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **91202401.5**

(51) Int. Cl.5: **C09D 5/00**, A01G 9/14

(22) Date of filing: **13.09.91**

(30) Priority: **26.09.90 NL 9002100**

(43) Date of publication of application:
01.04.92 Bulletin 92/14

(84) Designated Contracting States:
BE DE DK FR GB IT NL

(71) Applicant: **van Rossum, Antoon Johannes Gerardus**
Bredaseweg 211
NL-5038 NE Tilburg(NL)
Applicant: **Bertels, Antonius Franciscus Maria**
Bredaseweg 211
NL-5038 NE Tilburg(NL)

(72) Inventor: **van Rossum, Antoon Johannes Gerardus**
Bredaseweg 211
NL-5038 NE Tilburg(NL)
Inventor: **Bertels, Antonius Franciscus Maria**
Bredaseweg 211
NL-5038 NE Tilburg(NL)

(74) Representative: **Lips, Hendrik Jan George, Ir.**
HAAGSCH OCTROOIBUREAU Breitnerlaan 146
NL-2596 HG Den Haag(NL)

(54) Easily removable coating protective against solar radiation.

(57) With the help of a first material (product I) transparent surfaces such as glass plates or outer surfaces of horticultural greenhouses can be provided with a coating protective against solar radiation by spraying or another method, in which this product I becomes indelible as a result of chemical transformation, so that a weather-proof coating is obtained.

In order to remove this coating again, one applies a second material (product II) on top of this first material (product I) by spraying, which decomposes the indelibility of the first material, after which both materials can easily be removed from the transparent surface with the help of water.

coating 1, 14, 18, 19 & method.

102(b) + (2)

EP 0 478 067 A1

The invention relates to a method of applying a coating protective against solar radiation on a transparent surface such as a glass plate or the outer surface of a (horticultural) greenhouse, as well as for removing this coating later on.

The invention also relates to materials to be used therewith.

Removable coating protective against solar radiation are applied among other things with greenhouses in the glasshouse horticulture for preventing burning of the plants in the greenhouses in spring and summer. In practice, three methods are applied for this purpose.

The first method consists of the application of finely divided chalk (spraying chalk). This product is only temporarily effective and is removed from the greenhouses by rain and wind.

With the second method, a solid product is used which consists of fineground chalk and a banding agent. This product is blended with water and applied onto the greenhouses by spraying. The product is not particularly indelible and must be applied several times per season. A complete removal of the coating between times of in autumn can take place by brushing off. This can occur both mechanically, which requires an expensive apparatus, and with manual power, which is in turn rather labour-intensive and in economical view very unattractive. For removal of the coating, one also uses strong acid solutions that dissolve the chalk. Disadvantages of this method are, that the acid solutions are highly corrosive and that the binding agent remains behind on the glass as a blue film, with as a consequence a reduced light transmission.

With the third method, the coating applied is a dispersion paint. This product is reasonably weather-proof but can only be removed from the glass with great difficulty.

The disadvantages connected with removing the applied coatings with abovementioned second and third method are so great, that in practice one leaves the products on the glass. By action of the weather it will be partly removed in autumn or the beginning of winter by freezing off. However, this means that the luminous intensity is reduced during a number of months, which strongly delays the growth of the plants in this period.

The object of the invention is to provide a method of applying a coating protective against solar radiation onto a transparent surface such as a glass plate or the outer surface of a (horticultural) greenhouse, as well as of removing this coating again later on, in which the above-mentioned disadvantages have been removed.

To this end, the invention provides a method, in which one applies as coating onto the transparent surface a thin layer of a first material (product I), which becomes indelible after application as a result of chemical transformation, and

in which one for removing this coating later on applies a second material (product II) on top of the first material (product I), which decomposes the indelibility of the first material, after which both materials are removed from the transparent surface with the help of water.

According to the invention, one effectively makes use of a coating material (product I), which, during utilization thereof as a coating possesses the indelibility (weather-resistancy) required for such a coating, but the indelibility of which, if the material is to be removed again, can be discontinued with the help of the second material (product II), which causes the coating material (product I) to be easily removable, and can be taken off the transparent surface with the help of water (rain or rinse water).

Effectively, product I can with that consist of one or more inorganic substances, which in dried condition of product I are light-reflective, one or more film shapers, one or more active substances, a preserving agent and other additives.

In particular, product I can contain one or more inorganic pigments, at least one binding agent, at least one surface-active substance, a preserving agent and other additives.

An effective binding agent for product I is constituted by a an organic (co)polymere with (neutralized) carboxylic acid residues. A thus composed product I can be brought in sprayable form with the help of water of another suitable solvent, and be applied onto the glass surface to be protected by spraying.

Product II, which is used for making the coating consisting of product I removable again, consists of a solvent with at least one basic substance, at least one complex former, at least one surface-active substance and other additives. Particularly, in product II the solvent is water with a number of active components, among which one or more basic substances such as sodium hydroxide, one or more complex shapers such as trisodium salt of nitrilo-triacetic acid, one ore more surface-active substances, and other additives. The coating consisting of product I can be sprayed with such a basic product II, and by action of the basic material product I is decomposed in such a way, that the indelibility thereof disappears, so that product I together with product II are easily removable, for example by spraying clean with water. If one applies a coating, which in humid condition (with rain) need not be transparent, effectively finely divided calcium carbonate can be used as as a suitable pigment in product I. If on the other hand, one desires a

coating which also transmits light to a great extent in a humid condition, one could employ for example calcium silicate. A suitable binding agent for product I is further the ammonium salt of hydrolized, partially esterified styrene maleic acid anhydride.

In addition, other copolymeres with free carboxylic acid residues are also suitable as binding agent. Such binding agents are only slightly corrosive and are easily removable without burdening the environment. A great advantage of the method according to the invention and the materials used with it, product I and product II, is, that both product I and product II can be applied by spraying, whereby application and removal later on of a coating protective against solar radiation on a glass plate or such like can take place particularly easy.

The invention is furhter explained with the help of an embodiment.

EXAMPLE

A coating material of the following composition was prepared:

Composition product I	
finely divided calcium carbonate	30-60 percent by weight
ammonium salt of hydrolized partially esterified copolymere of styrene and maleic acid-anhydride	4-12 percent by weight
anti-foam agent	0-0,2 percent by weight
thickening agent	0-1 percent by weight
preserving agent	0,1 percent by weight
non-ionic detergent	0-0,1 percent by weight
water up to	100 percent by weight.

If this product was sprayed onto glass plates, after drying a coating protective against solar radiation formed, that had indelible properties.

For removing this coating again, a second material was prepared with the following composition:

Composition product II (in utility concentration)	
sodium hydroxide	0,05-3 percent by weight
trisodium salt of nitrilo-triacetic acid	1-5 percent by weight
detergent	0,05-1 percent by weight
water up to	100 percent by weight.

By spraying with this product II the coating of product I easily came loose, and the glass plates could easily be cleaned by subsequently spraying them with water.

Claims

1. Method for applying a coating protective against solar radiation onto a transparent surface such as a glass plate or the outer surface of a (horticultural) greenhouse, as well as for removing this coating again later on,

   in which one applies a thin layer of a first material (product I) onto the transparent surface, which material becomes indelible after application as a result of chemical transformation, and

   in which for removing this coating later on, one applies a second material (product II) on top of the first material (product I), that decomposes the indelibility of the first material, after which both materials are removed from the transparent surface with the help of water.

2. Method according to claim 1, characterized in that product I consists of one or more inorganic substances, which in dry condition of product I are light-reflective, one or more film shapers, one or more active substances, a preserving agent and other additives.

3. Method according to claim 2, characterized in that product I contains one or more inorganic pigments, at least one binding agent, at least one surface-active substance, a preserving agent and other

additives.

4. Method according to claim 3, characterized in that product I as binding agent contains an organic (co)-polymere with (neutralized) carboxylic acid residues.

5. Method according to one of the preceding claims, characterized in that product I is brought into sprayable form with the help of water of another suitable solvent.

6. Method according to one of the preceding claims, characterized in that product II consists of a solvent with at least one basic substance, at least one complex shaper, at least one surface-active substance and other additives.

7. Method according to claim 6, characterized in that in product II the solvent is water with a number of active components, among which one or more basic substances such as sodium hydroxide, one or more complex shapers such as trisodium salt of nitrilo-triacetic acid, one or more surface-active substances, and other additives.

8. Method according to claim 6 or 7, characterized in that product II is applied by means of spraying.

9. Method according to claim 3, characterized in that product I as pigment for the application of a coating protective against solar radiation, that need not be transparent with rain, contains finely divided calcium carbonate.

10. Method according to claim 3, characterized in that product I as pigment for the application of a coating protective against solar radiation, that transmits the light to a great extent with rain, contains finely divided calcium silicate.

11. Product I, to be used with the method according to claim 1, with the following composition:

finely divided calcium carbonate	30-60	percent by by weight
ammonium salt of hydrolized partially esterified copolymere of styrene and maleic acid-anhydride	4-12	percent by weight
anti-foam agent	0-0,2	percent by weight
thickening agent	0-1	percent by weight
perserving agent	0,1	percent by weight
non-ionic detergent	0-0,1	percent by weight
water	up to 100	percent by weight

12. Product II, to be used with the method according to claim 1, with the following composition:

sodium hydroxide		0,05-3	percent by weight
trisodium salt of nitrilo-triacetic acid		1-5	percent by weight
detergent		0,05-1	percent by weight
water	up to	100	percent by weight.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 20 2401

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	EP-A-0 115 694 (ICI) * claims 1,9,10 * *	1	C 09 D 5/00 A 01 G 9/14
A	EP-A-0 052 427 (ICI) * page 7, line 24 - line 30; claims 1,16 * *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

C 09 D
A 01 G
C 03 C

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	03 January 92	GIRARD Y.A.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same catagory
A : technological background
O : non-written disclosure
P : intermediate document
T : theory or principle underlying the invention

E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document